

USSN: 09/828,638
Atty. Docket No.: 2001B025
Amdt. dated June 24, 2004
Reply to Office Action of March 24, 2004

Amendment to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (previously presented): A printable plastic film, comprising:

- i) a plastic substrate layer;
- ii) a printable coating composition layer which comprises:
 - a) an anionic acrylic polymer;
 - b) epoxy acrylate in an amount sufficient to improve ink adhesion in said coating composition; and
 - c) a cross-linking agent,

wherein said cross-linking agent cross-links said anionic acrylic polymer to an extent sufficient to improve the resistance of said coating to isopropyl alcohol and/or hot water.

Claim 2 (previously presented): The plastic film of claim 1, wherein said anionic acrylic polymer is cross-linked by said cross-linking agent and exposure to at least room temperature.

Claim 3 (previously presented): The plastic film of claim 1, wherein said anionic acrylic polymer is an iminated polymer.

Claim 4 (previously presented): The plastic film of claim 1, wherein said cross-linking agent is selected from the group consisting of polyfunctional aziridine, epoxy silane, polyfunctional epoxy, polyvalent cation selected from the group of metal ions consisting of Zr, Zn, Ca, and Ti, acetoacetate, carbodiimide, urea formaldehyde, melamine formaldehyde and polyfunctional isocyanate.

Claim 5 (previously presented): The plastic film of claim 1, wherein said cross-linking agent is a polyfunctional aziridine.

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Claim 6 (previously presented): The plastic film of claim 1, wherein said cross-linking agent is selected from the group consisting of epoxy silane, polyfunctional epoxy, urea formaldehyde, melamine formaldehyde.

Claim 7 (previously presented): The plastic film of claim 6, wherein said cross-linking agent is added with a cross-linking catalyzing amount of a catalyst.

Claim 8 (previously presented): The plastic film of claim 7, wherein said catalyst is selected from the group consisting of imidazole, tertiary amine and p-toluene sulfonic acid.

Claim 9 (previously presented): The plastic film of claim 1, wherein said coating has dispersed therein a particulate or combination of different particulates.

Claim 10 (previously presented): The plastic film of 1, which further comprises a primer layer between said substrate layer and said coating composition layer.

Claim 11 (previously presented): The plastic film of claim 1, which has a dry coating weight of at least 0.1 grams/1000 in²; and an ink print image on the side of said coating opposite from said plastic substrate layer.

Claim 12 (previously presented): The plastic film of claim 1, wherein said epoxy acrylate is the reaction product of an ether containing a three member oxirane ring of a member selected from the group consisting of phenols, bisphenols, ring substituted bisphenols, resorcinol, hydroquinone, adipic acid, phthalic acid, hexahydrophthalic acid, 2-hydroxy-3-chloropropyl acrylate, allyl alcohol, phenol, 1,6-hexanediol, glycerol, phenol formaldehyde novolac resins, polyethylene glycol, polypropylene glycol, ethylene glycol, propylene glycol, 1-4 butanediol, 1-6 hexanediol glycerol, glycol, lower alkyl substituted hydantoin and mixtures thereof; and an unsaturated acid selected from the group consisting of acrylic acid and methacrylic acid, diacrylic acid, dimethylacrylic acid, triacrylic acid and trimethylacrylic acid.

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Claim 13 (previously presented): The plastic film of claim 1, wherein said epoxy acrylate is the reaction product of a glycidyl ether of a member selected from the group consisting of polyethylene glycol and polypropylene glycol; and an unsaturated acid selected from the group consisting of acrylic acid and methacrylic acid.

Claim 14 (previously presented): The plastic film of claim 1, wherein said epoxy acrylate is stabilized by the incorporation of a stabilizer selected from the group consisting of methyl ether of hydroquinone, and hydroquinone.

Claim 15 (previously presented): A printable coating composition for plastic film, which comprises:

- a) an anionic acrylic polymer;
 - b) epoxy acrylate in an amount sufficient to improve ink adhesion in said coating composition; and
 - c) a cross-linking agent,
- wherein said cross-linking agent cross-links said anionic acrylic polymer to an extent sufficient to improve the resistance of said coating to isopropyl alcohol and/or hot water.

Claim 16 (previously presented): The coating composition of claim 15, wherein said anionic acrylic polymer is cross-linked by said cross-linking agent and exposure to at least room temperature.

Claim 17 (previously presented): The coating composition of claim 15, wherein said anionic acrylic polymer is an iminated polymer.

Claim 18 (previously presented): The coating composition of claim 15, wherein said cross-linking agent is selected from the group consisting of polyfunctional aziridine, epoxy silane, polyfunctional epoxy, polyvalent cation selected from the group of metal ions consisting of Zr, Zn, Ca, and Ti, acetoacetate, carbodiimide, urea formaldehyde, melamine formaldehyde and polyfunctional isocyanate.

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Claim 19 (previously presented): The coating composition of claim 15, wherein said epoxy acrylate is the reaction product of:

1) a glycidyl ether of a member selected from the group consisting of phenols, bisphenols, ring substituted bisphenols, resorcinol, hydroquinone, phenol formaldehyde novolac resins, propylene glycol, polypropylene glycol, ethylene glycol, polyethylene glycol, 1-4 butanediol, 1-6 hexanediol glycerol, glycol, lower alkyl substituted hydantoin and mixtures thereof; and

2) an unsaturated acid selected from the group consisting of acrylic acid and methacrylic acid, diacrylic acid, dimethylacrylic acid, triacrylic acid and trimethylacrylic acid.

Claim 20 (previously presented): A label, comprising a printable plastic film containing:

- i) a plastic substrate layer having two sides;
- ii) a printable coating composition layer on one side of said plastic substrate layer, whose outer surface is printed, which coating composition comprises:
 - a) an anionic acrylic polymer;
 - b) epoxy acrylate in an amount sufficient to improve ink adhesion in said coating composition;
 - c) a cross-linking agent for said anionic acrylic polymer; and
- iii) an optional adhesive layer on the other side of said plastic substrate layer.

Claim 21 (previously presented): The plastic film of claim 1, wherein:

said plastic substrate layer comprises one or more film-forming thermoplastic materials selected from the group consisting of polyolefins, polyamides, and polyesters;

said anionic acrylic polymer is an iminated polymer;

said epoxy acrylate is the reaction product of an ether containing a three member oxirane ring of a member selected from the group consisting of phenols, bisphenols, ring substituted bisphenols, resorcinol, hydroquinone, adipic acid, phthalic acid, hexahydrophthalic acid, 2-hydroxy-3-chloropropyl acrylate, allyl alcohol, phenol, 1,6-hexanediol, glycerol, phenol formaldehyde novolac resins, polyethylene glycol, polypropylene glycol, ethylene glycol, propylene glycol, 1-4 butanediol, 1-6 hexanediol glycerol, glycol, lower alkyl substituted

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hydantoin and mixtures thereof; and an unsaturated acid selected from the group consisting of acrylic acid and methacrylic acid, diacrylic acid, dimethylacrylic acid, triacrylic acid and trimethylacrylic acid; and

said cross-linking agent is selected from the group consisting of polyfunctional aziridine, epoxy silane, polyfunctional epoxy, polyvalent cation selected from the group of metal ions consisting of Zr, Zn, Ca, and Ti, acetoacetate, carbodiimide, urea formaldehyde, melamine formaldehyde and polyfunctional isocyanate.

Claim 22 (previously presented): The printable coating composition of claim 15, wherein:

said anionic acrylic polymer is an iminated polymer;

said epoxy acrylate is the reaction product of an ether containing a three member oxirane ring of a member selected from the group consisting of phenols, bisphenols, ring substituted bisphenols, resorcinol, hydroquinone, adipic acid, phthalic acid, hexahydrophthalic acid, 2-hydroxy-3-chloropropyl acrylate, allyl alcohol, phenol, 1,6-hexanediol, glycerol, phenol formaldehyde novolac resins, polyethylene glycol, polypropylene glycol, ethylene glycol, propylene glycol, 1-4 butanediol, 1-6 hexanediol glycerol, glycol, lower alkyl substituted hydantoin and mixtures thereof; and an unsaturated acid selected from the group consisting of acrylic acid and methacrylic acid, diacrylic acid, dimethylacrylic acid, triacrylic acid and trimethylacrylic acid; and

said cross-linking agent is selected from the group consisting of polyfunctional aziridine, epoxy silane, polyfunctional epoxy, polyvalent cation selected from the group of metal ions consisting of Zr, Zn, Ca, and Ti, acetoacetate, carbodiimide, urea formaldehyde, melamine formaldehyde and polyfunctional isocyanate.

Claim 23 (previously presented): The label of claim 20, wherein:

said plastic substrate layer comprises one or more film-forming thermoplastic materials selected from the group consisting of polyolefins, polyamides, and polyesters;

said anionic acrylic polymer is an iminated polymer;

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said epoxy acrylate is the reaction product of an ether containing a three member oxirane ring of a member selected from the group consisting of phenols, bisphenols, ring substituted bisphenols, resorcinol, hydroquinone, adipic acid, phthalic acid, hexahydrophthalic acid, 2-hydroxy-3-chloropropyl acrylate, allyl alcohol, phenol, 1,6-hexanediol, glycerol, phenol formaldehyde novolac resins, polyethylene glycol, polypropylene glycol, ethylene glycol, propylene glycol, 1-4 butanediol, 1-6 hexanediol glycerol, glycol, lower alkyl substituted hydantoin and mixtures thereof; and an unsaturated acid selected from the group consisting of acrylic acid and methacrylic acid, diacrylic acid, dimethylacrylic acid, triacrylic acid and trimethylacrylic acid; and

said cross-linking agent is selected from the group consisting of polyfunctional aziridine, epoxy silane, polyfunctional epoxy, polyvalent cation selected from the group of metal ions consisting of Zr, Zn, Ca, and Ti, acetoacetate, carbodiimide, urea formaldehyde, melamine formaldehyde and polyfunctional isocyanate.

Claim 24 (new): The plastic film of claim 1, wherein:

said printable coating composition layer comprises the combination of (1) said crosslinked anionic acrylic copolymer, which has been cross-linked by said cross-linking agent to an extent sufficient to improve the resistance of said coating to isopropyl alcohol and/or hot water and (2) reactive acrylic double bonds provided by the presence of said epoxy acrylate in an amount sufficient to improve ink adhesion.

Claim 25 (new): The printable coating composition of claim 15, wherein:

said printable coating composition comprises the combination of (1) said crosslinked anionic acrylic copolymer, which has been cross-linked by said cross-linking agent to an extent sufficient to improve the resistance of said coating to isopropyl alcohol and/or hot water and (2) reactive acrylic double bonds provided by the presence of said epoxy acrylate in an amount sufficient to improve ink adhesion.

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Claim 26 (new): The label of claim 20, wherein:

said printable coating composition layer comprises the combination of (1) said crosslinked anionic acrylic copolymer, which has been cross-linked by said cross-linking agent to an extent sufficient to improve the resistance of said coating to isopropyl alcohol and/or hot water and (2) reactive acrylic double bonds provided by the presence of said epoxy acrylate in an amount sufficient to improve ink adhesion.